

Editorial

» Robert L. Barbieri, MD Editor in Chief



Stillbirth: Preventable tragedy or a lethal “act of nature”?

☎ We’ve made great progress on reducing fetal loss, but more is needed because too many late stillbirths still occur

Stillbirth late in pregnancy is a major obstetric tragedy. It traumatizes the mother, reverberates through the family for weeks, months, and, sometimes, painful years, and creates recurring waves of sadness, loneliness, anger, and wonder about a child who might have been.

Stillbirth is often defined as fetal loss after 20 weeks of pregnancy (if gestational age is known). By that definition, there are about 6 stillbirths for every 1,000 total births in the United States. Over the past 20 years, the rate of early fetal loss (at 20 to 27 weeks’ gestation) has remained relatively stable, whereas the rate of late fetal loss (28 weeks and later) has decreased by about 30%—likely because of better obstetric care.

Yet much more can be—should be—done to prevent stillbirth because, in part, a substantial number of stillbirths occur after 37 weeks of pregnancy. Here is one standardized, inexpensive way that we can reduce late fetal loss.

A woman at 38 weeks’ gestation reports decreased fetal movement. What’s your plan?

Instant Poll

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Assessing fetal movement

The Cochrane Systematic Review on the assessment of fetal movement as an indicator of fetal well-being, which was updated in 2006, concluded that 1) available data were insufficient to influence practice and 2) robust research was needed in this area.¹

In a recent study of more than 65,000 pregnancies, however, Tveit and coworkers reported that taking a standardized approach to a woman’s report of decreased fetal movement reduced the rate of late fetal loss by approximately 33%.² The study was designed as a multicenter intervention comprising:

- 7 months of preintervention (baseline) data collection, followed by
- standardized changes in practice, and then
- 17 more months of data collection.

Those “changes in practice” included 1) a standardized approach to patient education on how a mother should assess, and respond to, what she perceives to be a decrease in fetal movement and 2) a guideline for clinicians on how to respond when a patient offers a chief complaint of decreased fetal movement.

The centerpiece of the study’s patient education intervention is a

brochure* that includes a kick chart and detailed advice to the mother about how to count kicks and respond to what she perceives to be a decrease in fetal movement. She is advised to never wait until the next day to contact a health-care provider when she thinks that fetal movement has decreased.

The clinical guideline used in the study recommends that clinicians obtain, from all women who report decreased fetal movement, a nonstress test (NST) and an obstetric sonogram to assess fetal movement, amniotic fluid volume, and fetal growth and anatomy.

Impact of the intervention

Here is what investigators found:

- Before the intervention, baseline late fetal loss rate for the entire pregnant population at the study sites was 3 for every 1,000 births; afterward, that rate fell to 2 for every 1,000.
- The intervention did not significantly increase the number of women who self-reported decreased fetal movement.
- Before the intervention, 6.3% of pregnant women reported decreased fetal movement; afterward, that rate was 6.6%.

*Find this brochure through a link within the online version of this Editorial at www.obgmanagement.com.

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Some suggestions on offering support for mother and family after stillbirth

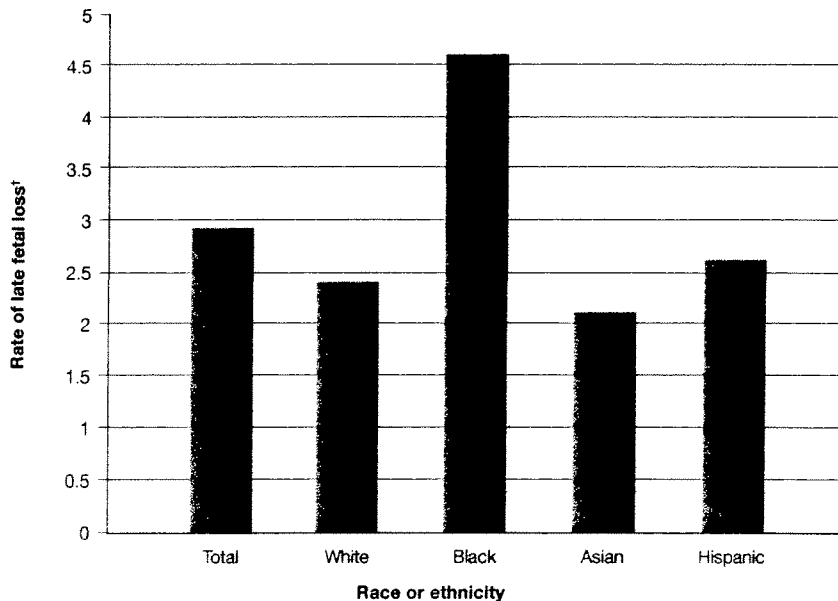
You can do a world of good by providing support for a woman who has just experienced stillbirth; in fact, **such support, done well, is as important as the interventions you put in place to prevent fetal loss.** Although few high-quality studies have yielded evidence that can guide your response, after the tragedy of a stillbirth, to a grieving mother and her family, two small-scale observational and qualitative studies^{1,2} recommend that you:

- reduce the woman's perception of chaos and loss of control
- support an individualized approach to her interaction with, and separation from, the fetus
- support her grieving and be sensitive to its critical steps, including denial, isolation, anger, and depression
- provide her with a comprehensible explanation for the stillbirth
- develop a well-organized care pathway from diagnosis of the loss through to delivery or surgical termination and recovery
- provide opportunity for follow-up with her and her family as a way to offer closure.

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FIGURE Looking by race and ethnicity, blacks have the highest rate of late* fetal loss



*28 weeks or later.

†For every 1,000 (total) births beyond 20 weeks' gestation.

Adapted from: Centers for Disease Control and Prevention. MacDorman MF, Kirmeyer S. Fetal and perinatal mortality, United States, 2005. *Natl Vit Stat Rep*. 2009;57:1-20.

- Among women who reported decreased fetal movement, the late fetal loss rate fell—from 4.2% at baseline to 2.4% after the intervention ($P < .004$).
- Among women who reported decreased fetal movement, the **late fetal loss of a normally formed fetus decreased**—from 3.9% to 2.2% ($P < .005$).
- Because of ultrasonography, antenatal detection of growth-restricted fetuses increased significantly after the intervention.

What lesson can we take home?

In many birthing centers in the United States, the approach to decreased fetal movement isn't standardized. Taking a standardized approach to patient education about fetal movement and having a standardized clinical response that includes NST and sonography—the cornerstones of the Tviet study—is likely to reduce the rate of late fetal loss.

This approach to testing has a serendipitous advantage: It isn't associated with a massive increase in cost for additional testing.

Many hurdles ahead

The risk of late fetal loss is influenced by many variables, including:

- gestational length
- maternal age
- race and ethnicity (see the **FIGURE**)
- parity
- level of education
- history of fetal loss
- numerous maternal and fetal diseases (e.g., maternal diabetes, hyperthyroidism, and hypertension; fetal growth restriction and congenital anomalies).

Key word: "Optimize." The question of how to develop clinical algorithms that optimize pregnancy outcome by

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Instant Poll

Decreased fetal movement and a triple nuchal cord at term. What is your approach?

A 29-year-old woman, G2P1, reports decreased fetal movement at 38 weeks' gestation. Your physical exam is unremarkable; a nonstress test is reactive. You obtain an obstetric sonogram, with these findings:

- fetal movement is detected
- amniotic fluid volume is normal
- estimated fetal weight is at the 15th percentile
- anatomic survey is normal.

The sonography specialist calls you to report that she sees a triple nuchal cord—a finding that she observes only rarely.

The patient has had one previous vaginal delivery; the baby weighed 7 lb at birth.

Your plan is (most closely) to:

- ☐ recommend twice-weekly fetal testing and wait until labor begins spontaneously
- ☐ induce labor immediately
- ☐ perform cesarean delivery immediately
- ☐ wait; induce labor at 39 weeks
- ☐ perform amniocentesis and
 - 1) induce labor now if fetal lung indices show maturity or
 - 2) induce labor at 39 weeks if those indices show immaturity

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identifying an optimal upper limit of an optimal time for delivery hasn't been answered because the matter hasn't been exhaustively studied in randomized trials. It will be a challenge to validate such algorithms, because any strategy runs the risk of utilizing substantial health-care resources for modest clinical gain.³⁻⁵

Until sophisticated, multifactorial algorithms for identifying an optimal due date are developed, clinicians are left to select a few prominent variables to guide their recommendations—such as gestational length and maternal age. For a healthy woman, expectant management of pregnancy beyond 41 weeks is associated with an increase in the rates of stillbirth; meconium staining and meconium aspiration syndrome; and cesarean delivery. Based on these observations, many obstetricians routinely offer elective delivery to women who have reached 41 weeks' gestation but have not begun spontaneous labor.⁶

As I noted, in addition to gestational age, such variables as the mother's age and race influence optimal timing of delivery. Examples: For a woman 40 to 44 years old, delivery between 38 and 39 weeks' gestation may be optimal to prevent stillbirth. For a woman 25 to 29 years old, it is likely safe to allow the pregnancy to progress to 41, possibly 42 weeks' gestation before delivery.⁷

In addition, given the increased risk of stillbirth among black women (FIGURE), it might be reasonable to consider using race to 1) guide the decision to initiate fetal testing and 2) determine the optimal time for delivery.^{8,9}

4,000 fewer tragedies would be a blessing

With 4 million births annually in the United States, a late fetal loss rate of

3 for every 1,000 total births means 12,000 near-term stillbirths. Monitoring fetal movement, and responding promptly and in a standardized manner when it decreases, would reduce late fetal loss by 33%. That is 4,000 more live births, every year.

Look how a small shift in practice can bring a significant change in outcome—each one of those babies a precious gift to a mother and family! ☺

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Where you can send families for support after loss of a pregnancy

- www.compassionatefriends.org
- www.nationalshare.com
- www.misschildren.org
- www2.marshfieldclinic.org/wissp

Reduction of late stillbirth with the introduction of fetal movement information and guidelines-a clinical quality improvement

BMC Pregnancy and Childbirth 2009, 9:32

Hom Tevit, et al.

- Women experiencing decreased fetal movements (DFM) are at increased risk of adverse outcomes, including stillbirth.
- All singleton third trimester pregnancies presenting with DFM were registered and outcomes were collected independently at 14 hospitals in Norway. After a baseline was collected an intervention was implemented.
- During the baseline period undesirable behavior was frequent, with one-third of the women not presenting before absence of FM was perceived and one-quarter of women waiting for more than 24 hours. An initial survey found a wide range of definitions of DFM used to inform women.
- A systematic review of all currently published literature was done to determine the optimal management for women with DFM. The guidelines recommended were a standard clinical evaluation for all women reporting DFM, a Non-Stress Test, and an ultrasound scan to quantify FM, amniotic fluid volume and fetal anatomy and growth.
- A brochure of information was provided as a part of routine information given to women in 17-19 weeks of pregnancy. The brochure included "rules of thumb" about fetal activity.
- The overall stillbirth rate among women was reduced by one-third.**
- The stillbirth rate among women reporting DFM was reduced by almost 50%.
- There was no increase in secondary outcomes such as preterm births, fetal growth restrictions, transfers to neonatal care or severe neonatal depression among women with DFM during the intervention.
- A much-debated issue is whether women should receive uniform information about FM.
- A large cluster multicentre cluster-randomized controlled trial in 1989 (Grant A, Valentin L, Elbourne D, Alexander S: Routine Formal Fetal Movement Counting and Risk of Antepartum Late Death in Normally Formed Singletons. *Lancet* 1989, 2:345-349) failed to demonstrate a benefit of using a "Kick Count Chart" for all pregnancies. This is the most referred-to and influential publication on maternal counting, and as such is often cited as evidence against FMC. However, this trial had several of limitations. Of greatest importance is the issue of contamination between the groups through the use of "within-hospital" clusters. The problem of contamination is compounded by the use of Kick Charts for control-group women on the basis of clinical discretion as a part of the trial design. While no difference was shown in the stillbirth rate across the study groups, the overall late-gestation stillbirth rate fell during the study period from 4/1000 to 2.8/1000."
- Reports from a variety of locations suggest that significant variability in the management of DFM and of information given to expecting women is a wide-spread quality issue in obstetric care.

ORIGINAL ARTICLE

Maternal characteristics and pregnancy outcomes in women presenting with decreased fetal movements in late pregnancy

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Abstract

Objective. 'Normal' fetal activity is recognized as a sign of fetal well-being and concerns for decreased fetal movements is a frequent cause of non-scheduled antenatal visits. The aim of this study was to identify maternal characteristics in women presenting decreased fetal movements in a total population, to identify the risk of adverse outcomes and assess the management provided. **Design.** Prospective population-based cohort. **Setting.** Fourteen delivery units in Norway. **Population.** A total of 2,374 pregnancies presenting with a perception of decreased fetal movements and 614 control/referent cases. **Methods.** All singleton third trimester pregnancies presenting with a perception of decreased fetal movements were registered from June 2004 through October 2005. Pregnancies never examined for this condition were collected as a cross-sectional sample from the same population. **Main outcome measures.** Fetal growth restriction, preterm birth and stillbirth. **Results.** Mothers with decreased fetal movements were more often smokers, overweight and primiparous. Of the women, 32% presented with perceived absence of fetal movements, of whom 25% waited for more than 24 hours without any movements. Abnormal findings were identified in 16% of examinations. Decreased fetal movements were associated with adverse pregnancy outcome in 26%, including preterm birth and fetal growth restriction. An intervention or repeated consultations were performed in 41% of cases, including 14% admissions to maternity ward. None of the included hospitals had written guidelines for management. **Conclusions.** A perception of decreased fetal movements is significantly associated with adverse pregnancy outcome such as preterm birth, fetal growth restriction and stillbirth. Guidelines for management and information to pregnant women are needed.

Key words: Fetal movements, decreased fetal movements, stillbirth, information, management

Introduction

Decreased fetal movements (DFM) is a frequent reason for unplanned consultations through the third trimester ranging between 4% and 16% in various populations (1–3). It is often a sign of fetal compromise and associated with severe outcomes such as fetal growth restriction (FGR), preterm birth (PTB) and fetal death (4–7).

In pregnancies deemed to be at risk, a reduction in fetal movements (FM) is associated with a variety of pregnancy pathologies (1,6). The majority of consultations occur, however, in low-risk pregnancies. Controversy exists as to whether these should be considered risk pregnancies at all, and if so, for what reason (1). While most smaller studies indicate risk (1), one of the largest study to date has reported better outcomes in pregnancies with DFM in a total

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population than in control pregnancies (8). Knowledge of which pregnancies that are more likely to be affected in a total population and their risk of adverse outcome is limited.

A recognition of DFM may prevent adverse outcomes and excessive delay in maternal reporting of DFM is associated with perinatal deaths (4,9). New guidelines for pregnancy care suggest reduced frequency of antenatal visits and screening tests (10,11). Pregnant women should assume more responsibility for their baby's health, but the tools that would empower them and allow them to act on signs of complications are not identified.

No evidence-based guidelines for management of DFM exist (1,2,6,12). Consequently, a wide variation are published ranging from non-stress test (NST) as the sole screening tool to hospitalization of all women with DFM (2,6,12).

We aimed to identify maternal characteristics in women presenting DFM in a total population, to identify the risk of adverse outcomes and to assess the management provided.

Material and methods

Women with a singleton pregnancy of 28 weeks gestation or more with a concern of DFM (either by spontaneous reporting or upon questioning) were registered prospectively at 14 delivery units in eastern Norway and the city of Bergen as a part of the international collaboration, Fetal Movement Intervention Assessment (Femina). Data of women with stillborn infants were captured prospectively, but stillbirths not initially identified by DFM were excluded, as were recurrent visits from which a previous consultation for DFM was registered. To ensure unbiased registrations for quality assurance purposes, maternal consent was not sought. DFM were defined as present in any woman presenting with this condition irrespective of whether it was based on her subjective opinion or had emerged during a visit for other reasons. Femina was approved by the Regional Committees for Medical Research Ethics and Personal Data Act and approval was also obtained from the Norwegian Data Inspectorate.

The registrations started in June 2004 and continued throughout October 2005. In Norway, community midwives and general practitioners are in charge of the antenatal program, and without the possibility to obtain NST or ultrasound locally, they refer the women to the nearby hospital. Hence, the women usually contact maternity wards directly with their concerns for DFM. Private delivery wards are

non-existent. Women fulfilling the inclusion criteria were registered at the time they presented at the hospital (defined as 'DFM women' in the following). Pregnancy outcome was collected independently after delivery from the medical files. In addition, all stillbirths not identified primarily by DFM were registered retrospectively to ensure completeness. Data were made anonymous and submitted to the study center. Pregnancies never examined for DFM were collected as a cross-sectional sample of third trimester singleton live births in June 2005 by questionnaires to the same pregnant population after delivery (response rate 60.4%, $n = 614$, defined as 'referent group' in the following). The power of the sample size was calculated using the Vanderbilt PS Power and Sample program.

We aimed for a 3:1 case-control ratio able to detect an odds ratio (OR) of 2 for cases in outcomes with a prevalence of $>2.5\%$ among controls (such as severe FGR) with a power of 80% and a significance level of $p < 0.05$.

Outcome measures were based on data on the Femina registration forms including: maternal characteristics and potential risk factors for DFM; i.e. maternal age > 35 years, maternal overweight defined as a pre-pregnancy body mass index (BMI) > 25 , smoking, primiparity and fetal gender. Maternal behavior was measured by expectance before contacting health professionals if the woman perceived absence of FM or DFM; dichotomized at >24 hours with absent FM and >48 hours with DFM (7,9,13). The circumstances under which the concerns were presented were registered. Outcomes related to pathology detected and pregnancy outcome were all deaths from 28 weeks of gestation, i.e. antepartum ($n = 82$), intrapartum ($n = 12$) and neonatal ($n = 1$) deaths; PTB (28^{+0} – 36^{+6} weeks) and FGR (< 10 percentile of birthweight for gestational age adjusted for gender, maternal height, weight, parity and ethnicity (14); fetal heart rate tracings judged as non-reassuring leading to intervention in labor; oligohydramnios (amniotic fluid index < 5 cm or < 2.5 percentile) and polyhydramnios (amniotic fluid index > 25 cm or > 97.5 percentile). Management by health professionals included investigations undertaken for DFM, interpretation and consequences (follow-up).

All statistics were performed with SPSS 15.0 (SPSS Inc., Chicago, IL, USA). Univariate and multiple logistic regression analyses were done to determine risk factors for DFM and the risk for adverse outcome with DFM, using crude (unadjusted) and adjusted OR with 95% confidence intervals (CI). Variables with a $p < 0.2$ in the univariate analysis were entered into a multivariate model, followed by backward stepwise model excluding the non-significant

variables. The final model was tested for goodness-of-fit. p -Values < 0.05 were considered significant.

Results

Of 38,728 pregnancies, 2,374 (6.6%) were examined in hospital for concerns of DFM (Figure 1). Thirty-five cases (1.5%) were lost to follow-up due to birth at another hospital, mostly within the city of Oslo (expected to be born alive as all stillbirths were captured irrespective of place of delivery). Twelve of the fourteen hospitals admitted all DFM women for a clinical examination, irrespective of perceived severity. Two examined the women only after a conversation with a midwife deciding on the necessity of examination.

DFM women were more often smokers, primiparous and overweight. There were no differences in maternal age or fetal gender (Table I).

Eighty-seven percent contacted health professionals spontaneously for their worries, 13% reported their concerns during scheduled visits while one-third only did this after specific questions by the healthcare provider. Sixty-six percent contacted the hospital directly, while 34% contacted their primary providers first. In 8.7%, DFM were reported during visits for

other pregnancy complications. Thirty-two percent presented with perceived absence of FM, of whom 25% had waited for >24 hours. Among DFM women who reported a decrease, but not absence of FM, 54% had waited >48 hours. Forty-five percent presented preterm, 54% at term and 1.4% after 42 completed weeks of gestation.

At examination, abnormal findings were detected in 16%, including non-reassuring NST (13%), abnormal amniotic fluid volumes (5.9%), FGR (3.4%) and fetal malformation (0.6%).

Being affected by DFM resulted in adverse outcome in 26% (Table II), including PTB and FGR with an OR of 2 for FGR and an OR of 5 for PTB (Table III), respectively. Exclusion of risk pregnancies (DFM reported during visits for other pregnancy complications) did not alter these results (data not shown). There were a total of 95 deaths (4.1%) among DFM women. Eighteen (19%) presented with a live fetus at the hospital of which 14 died later at term. Of the 18, three were advised to return to standard care while 2 were signed up for repeated visit. Admission for emergency cesarean section was decided upon in six instances. The remaining seven were admitted for observation or induction. In the five cases where the mother either returned to standard care or signed up for repeated visit, the mother

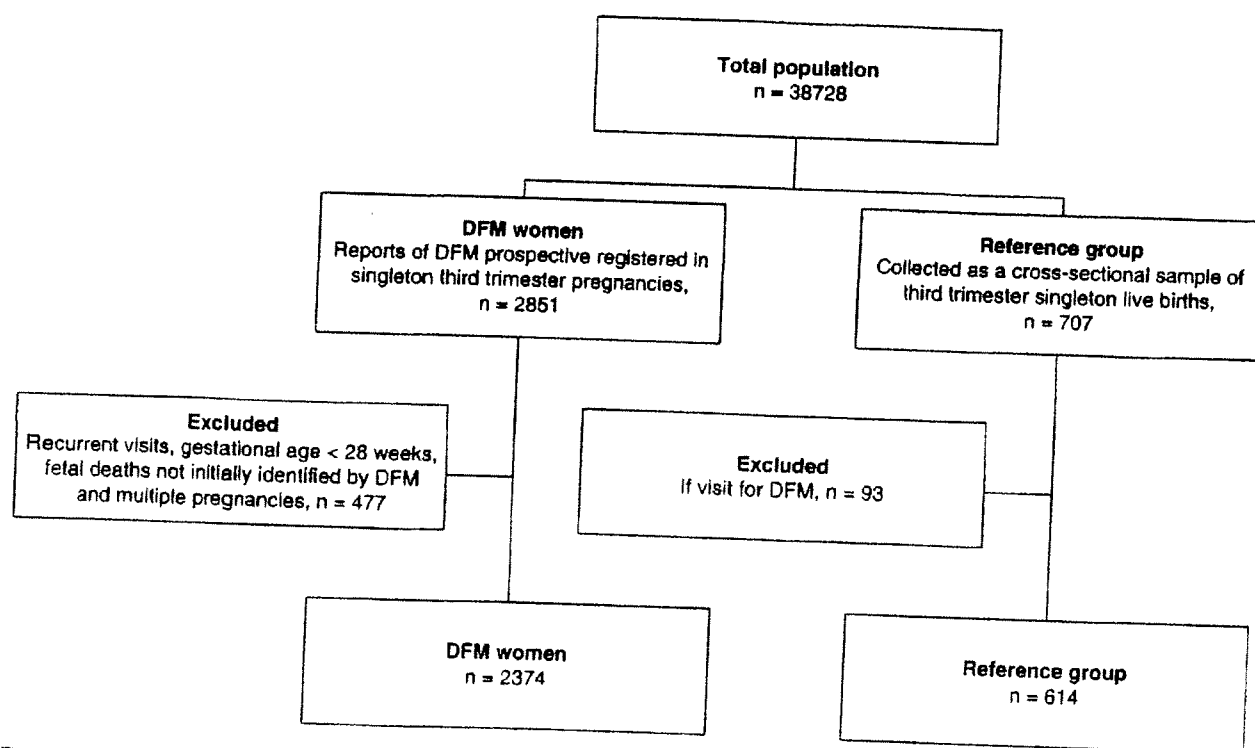


Figure 1. The study profile of decreased fetal movements in late pregnancy. Note: DFM, decreased fetal movements.

Table 1. Risk factors for DFM. DFM women compared to the referent group.

	DFM women n = 2,374 n (%)	Reference group n = 614 n (%)	Univariate			Multivariate		
			Crude OR	95% CI	p-Value	Adjusted OR [†]	95% CI	p-Value
Age > 35 years	377 (16)	119 (20)	0.8	0.6–1.0	0.05	Excluded		
Primiparity	1,099 (51)	221 (39)	1.6	1.3–2.0	<0.001	1.6	1.3–2.0	<0.001
BMI > 25	785 (38)	204 (34)	1.2	1.0–1.5	0.03	1.3	1.1–1.6	0.01
Smoking	249 (11)	43 (7.5)	1.5	1.1–2.1	0.01	1.4	1.0–2.0	0.05
Gender‡								
Male	720 (51)	298 (51)	1.0	0.9–1.3	0.72	Not included		
Female	706 (49)	282 (49)						

Univariate and multivariate logistic regression showing crude (unadjusted) and adjusted OR with their 95% CI. $P < 0.05$ significant.

[†]OR adjusted for BMI > 25, maternal age > 35, primiparity, smoking habits (considered potential confounding factors).

[‡]Fetal gender was not recorded in the first 1,000 cases.

Note: DFM, decreased fetal movements; OR, odds ratio; CI, confidence interval; BMI, body mass index.

returned later for DFM. Four were diagnosed with fetal death at the second visit, while the last had an appointment for a repeat visit but returned in labor and had a stillbirth.

An NST was performed in 96% of the DFM women, 86% were examined by ultrasound, and 39% by Doppler. Of the consultations, 14% resulted in admission to hospital for observation (4.8%), induction (7.6%) or emergency cesarean section (1.5%). Fifty-nine percent returned to standard care, while repeated visits were planned for the remaining 27%.

Discussion

We found that smoking habits, being overweight (or high BMI) and primiparity were considerable risk factors for perceiving DFM. Women experiencing DFM in a total population were at increased risk for adverse outcome such as PTB and FGR.

We benefitted from a large sample and the inclusion of information on whether complications were known before the consultation and reduced bias by using prospective data collection without maternal consent, combined with retrospective collection of pregnancy outcomes without participation from the care-giver. However, this had led to difficulties in identifying an equally unselected control or referent group. DFM are not coded in the electronic medical files of the Norwegian hospital system or in the Norwegian Birth Registry. There is no ICD 10 code for DFM. Identifying a referent group therefore required maternal consent and participation, and the use of a cross-sectional questionnaire with retrospective questions

may have introduced recall bias. Participation may have been skewed as women with a particular awareness of FM (those who had experienced some concern for DFM) may be overrepresented, which would cause underestimation of the true results. However, as the incidence of adverse outcomes in the referent group were low, it is reasonable to believe that the impact of bias would have been reduced (15). On the other hand, recruitment bias towards women at low risk for adverse outcomes (such as FGR and PTB) may lead to an overestimation of the risk among women with DFM. The third trimester PTB rate in Norway has been stable at about 6% during the last few years (16), and the rate of 2.4% preterm live births among third trimester referent cases may seem low. However, as the national data include all stillbirths, multiple pregnancies and pregnancies complicated by DFM, the true rate in the population may be close to the finding among our referent group. Thus, the PTB rate of 13.5% in DFM indicates a considerable risk. The referent group was too small to estimate mortality. However, the official stillbirth rates during the same period in the third trimester were reported to be 3.0/1000 in our population (data not shown). Thus, a 10-fold mortality among the DFM women indicates a considerable risk. The response rate in the referent group was relatively low. However, analyzing the hospitals within the group (low vs. high response rate) did not show any differences in covariates or outcome measures. In addition, data from the Medical Birth Registry in Norway confirmed that our referent population was comparable to the rest of Norway (15).

Smokers, overweight and primiparous women were more likely to present with DFM. Smoking during

Table II. Adverse pregnancy outcomes of pregnancy if affected by decreased fetal movements divided by preterm and term pregnancies.

	Total n (%)	Preterm n (%)	Term n (%)
Preterm birth < 37 weeks	141 (13.5)	141 (100)	-
FGR < 10 percentile	321 (14)	153 (15)	168 (14)
Severe neonatal depression	6 (0.3)	3 (0.3)	3 (0.2)
Fetal/neonatal death	95 (4.1)	43 (4.1)	52 (4.0)
Total, adverse outcomes	605 (26)	274 (26)	331 (25)

Note: FGR, fetal growth restriction.

pregnancy has been linked to various adverse outcomes and the pathophysiological mechanism suggested includes reduced uteroplacental blood flow and fetal hypoxia to explain the DFM (17). Being overweight is hazardous to the women and the fetus, and there are reports of increased adverse outcomes in overweight women with a BMI of 25–29.9 kg/m² (18). Still, the use of maternal perception of DFM as the defining event leaves us unable to detect whether they have a truly lower fetal activity due to higher risk of fetal hypoxia or lower ability to perceive FM due to excess adipose tissue. Primiparous women are reported to perceive less FM early in the third trimester, but relatively quickly reach a parous level (19). Again, it is uncertain whether this is due to higher risk or lower ability to perceive movements. However, as DFM are associated with adverse outcomes, maternal inexperience could become an added risk factor for these women and their pregnancies. Better tools are needed to empower them and provide awareness.

Being affected by DFM increased the risk of PTB and FGR. Although an early study indicated an increased risk for PTB in DFM (20), several studies have failed to detect such an association (3,8,21). However, some of the core outcomes such as FGR were not reported and the most severe cases of DFM

(i.e. perceived absence) were excluded. The reduced risk of PTB also indicated (8), was probably caused by the fact that a large proportion of women only presented at term (i.e. not eligible for assessment of increased risk of PTB). When including only the at-risk population, some might have found an association (22). Ultrasonographic studies have shown that growth-restricted fetuses move less than appropriately grown fetuses and that their movements are qualitatively abnormal (23). Valentin et al. found the same association between DFM and an increased risk of birthweight < 2,500 g or birth of an SGA baby (20). Even though others indicate the same risk (3), their sample size has been too small to prove significant.

Maternal vigilance towards FM is important as a large proportion of the women experiencing an unexplained stillbirth have noted a decrease in activity before the death of the fetus (1,7,9,13). In our material, 43% (n = 29) of the 68 women affected by a stillbirth and observing an absence in FM had waited >24 hours with no movements before contacting health professionals (data not shown). This is consistent with an earlier study reporting that half of these women waited >24 hours with absent FM, while one-third waited >48 hours (4). As DFM are associated with adverse outcomes, maternal lack of awareness may be a risk factor for her pregnancy. Generally, women seem poorly informed about the significance of FM in the third trimester. In addition, health professionals have varying recommendations about expected normal fetal activity. A survey of all 55 birth clinics in Norway indicated that the clinicians' advice about what to report varied from 'a marked decrease' to 'absent FM > 24 hours' (24). Similar advice has also been noted in Australia (Flenady et al., Proceedings of the Perinatal Society of Australia and New Zealand 9th annual congress, Perth 2006) and in the UK (25). This may affect women's reporting of DFM, resulting in both under-reporting of significant changes as well as overuse of unnecessary investigations.

Table III. Risk for adverse outcome if DFM, n = 2,374. DFM women compared to the referent group.

	Univariate			Multivariate		
	DFM women, n = 2,347 n (%)	Referent group, n = 614 n (%)	Crude OR	95% CI	p-Value	Adjusted OR
Preterm birth < 37 weeks	141 (13.5)	14 (2.4)	6.3	3.6–11.0	<0.001	4.8
FGR < 10 percentile of birthweight	321 (14)	50 (8.7)	1.7	1.3–2.4	<0.001	1.6
						95% CI
						p-Value
						0.01

Univariate and multivariate logistic regression showing crude (unadjusted) and adjusted OR with their 95% CI. P < 0.05 was considered significant. OR in the multivariate analyses adjusted for BMI > 25, primiparity and smoking.

Note: DFM, decreased fetal movements; OR, odds ratio; CI, confidence interval; BMI, body mass index; FGR, fetal growth restriction.

There have been attempts to find a definition of DFM based on a given cut-off value and a dozen kick charts and limits have been published (1). However, with the large inter- and intra-observer variability in FM, no alarm limit has so far proven superior to the mother's subjective perception of DFM (1,12,22,26). The daily routine of monitoring FM may be a guidance and tool to increase vigilance and remind women of daily attention to FM as a sign of their babies' well-being (1).

An opportunity for improvement is not only related to improved awareness. The two most common reasons for criticism of care on audits of stillbirth have been misdiagnosis and mismanagement of FGR and reports of DFM (27,28). In our study, 18 of 95 (19%) stillbirths that were associated with DFM had a live baby when they presented at the hospital, but all died within one week after this visit. A survey of all delivery units in Norway showed that none had any written protocol or guidelines for management of such pregnancies (2). In fact, no evidence-based guidelines are available internationally, as the issue has remained unexplored (6,12). Consequently, the monitoring of DFM consumes significant resources with a differentiated management of unknown quality. Knowledge of what conditions that are associated with DFM and the associated risk must form the basis of these guidelines.

In conclusion, this study indicates that women in a low-risk population experiencing DFM are at risk for adverse outcome such as PTB and FGR. Guidelines for management and information to women, as well as new and individually adjusted definitions of DFM are needed.

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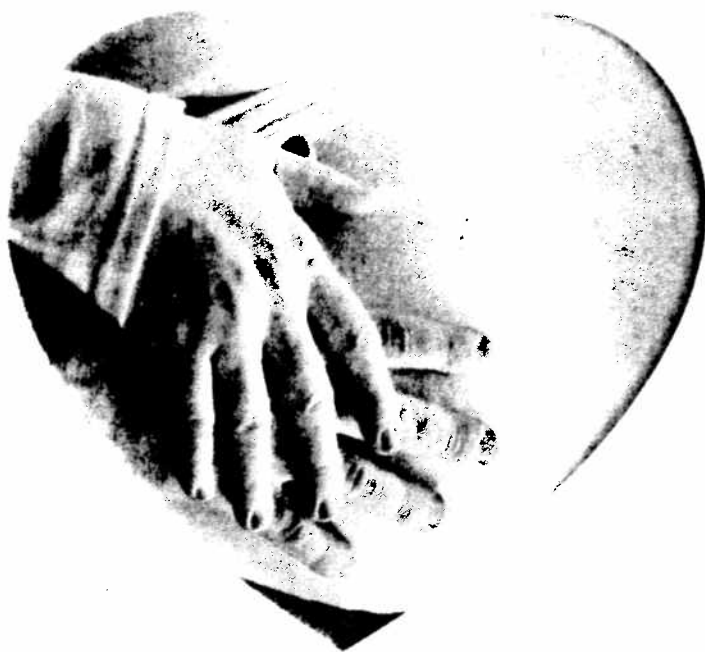
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KICKS COUNT!

*What your baby's Kicks
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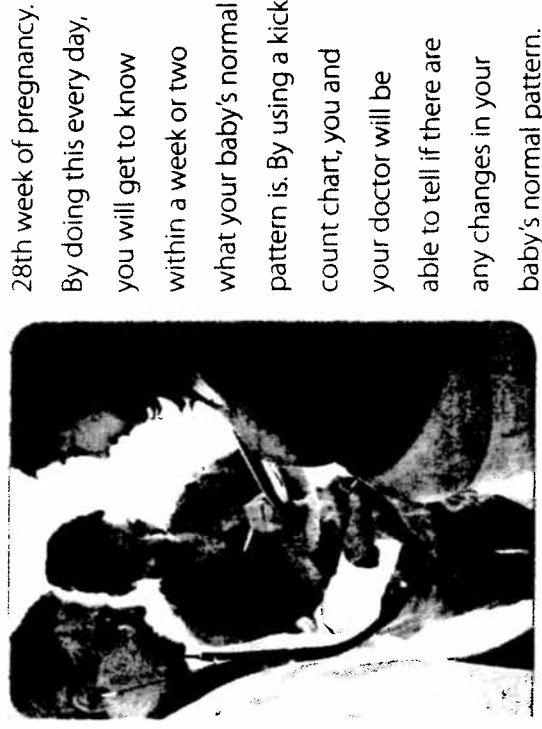
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Kicks Count!

Counting your baby's kicks is a great way for you and your partner to bond with your baby. By performing a kick count at the same time every day during your last trimester, you can also help your doctor monitor your baby's health. **What your baby is telling you with its kicks is important!**

Doctors recommend that parents start counting and keeping track of their baby's kicks beginning in the



28th week of pregnancy.

By doing this every day, you will get to know within a week or two what your baby's normal pattern is. By using a kick count chart, you and your doctor will be able to tell if there are any changes in your baby's normal pattern.

Studies show that a major decrease in your baby's normal pattern could be a signal that there's a problem.

Counting kicks is a simple, inexpensive and effective way to monitor your baby's health and may reduce the risk of stillbirth!

Performing a Kick Count

Pick a time of day when your baby is usually most active, ideally after you have had a snack or light meal. It is best to perform your kick count at the same time every day.

Sit with your feet up or lie down on your side when you are ready to start counting. If you think your baby is asleep, try pushing on your tummy or getting up and walking around for a few minutes to wake him. You can also try drinking something cold. Don't start counting until you know your baby is awake.

- Count each of your baby's movements as one kick. Kicks include twists, turns, swishes, rolls and jabs. Don't count hiccups!

- Count until you reach 10 kicks and log the number of minutes it took on your chart. It will take most moms less than 30 minutes to count 10 kicks, but could take up to two hours.

After a week or two, you will see that the kicking varies from day to day, but for the most part the days seem similar. This will continue to be the case for a healthy baby.

*Download a kicks count chart at
www.firstcandle.org/kickscount*

Using a kicks count chart

Using a kicks count chart is easy! Make sure you note the day you begin counting, your due date and the time of day you will be counting at the top of the chart.

Remember, each twist, turn, swish, roll or jab counts as one kick!

When you have performed your kick count for Day 1, simply check the box that corresponds with the number of minutes it took for you to feel 10 kicks.

For example, if it took 15

minutes, you would go down

the Day 1 column until you

found the line for 11-15 minutes

and put your check mark in that

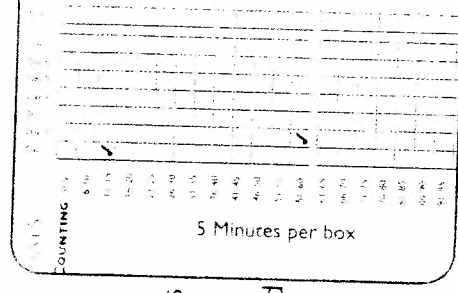
box. If it took an hour, you would

scroll down to the line for 56-60

minutes and put your check

mark there.

That's it! Repeat the same process every day for the remaining weeks of your pregnancy. Take your chart with you to your doctor visits.



If you notice a significant decrease in your baby's activity, call your doctor immediately!

What to do if you are worried

If you are worried about your baby, you should always ask your doctor for advice. But there are certain situations when you should call your doctor immediately:

- If your baby kicks less and less in the course of a day or you don't feel any kicks on any given day.
- If you don't feel 10 kicks in a two-hour period when your baby is usually active, recount within 1-2 hours. If you get the same results, call your doctor immediately.
- If you have been evaluated for decreased fetal movement and sent home, make sure you follow up as instructed or within one week.
- It might be helpful to know that very rarely does a baby kick less than 10 times during a two-hour period.
- It is also important to note that all babies have regular sleep/wake cycles and your baby will sleep many times a day. However, even near the end of pregnancy, most babies do not sleep for longer than one hour at a time. Make sure your baby is awake before you start counting!

Never wait until the next day to call your doctor if you are feeling decreased activity!

Additional Tests

Once you report decreased activity, your doctor should have you come to the office or go directly to your hospital's labor and delivery unit. There are other tests that can be done to check on your baby's health:

- Non-stress test - monitoring your baby's heart rate in response to its own movements.
- Ultrasound - taking pictures from sound waves to check the growth of the baby, amniotic fluid quantity, placenta, blood flow pattern, etc.
- Biophysical profile - using an ultrasound exam with a non-stress test to evaluate your baby's heart rate, breathing, body movement, muscle tone and amniotic fluid quantity.
- Contraction stress test -- monitoring your baby's heart rate in response to uterine contractions.

Never hesitate to get a second opinion if you feel you are not getting a thorough evaluation and/or you continue to be worried.

Other important things to know

Monitoring your health during the last trimester is important too. Here are some helpful tips:

Continue good prenatal care Eat well, get plenty of rest and keep all doctor appointments. Keep diabetes and high blood pressure under control.

Know the warning signs of premature labor Call your doctor if you have one or more of the following symptoms:

- Contractions (abdomen tightening like a fist every 10 minutes or more often)
- Vaginal bleeding or leaking fluid
- Pelvic pressure (like your baby is pushing down)
- Low, dull backache
- Cramps that feel like your period
- Abdominal cramps (with or without diarrhea)

Take a childbirth class This will help you prepare for labor and delivery.

Safe sleep saves lives! Learn about the importance of safe sleep for your baby before you leave the hospital.
www.firstcandle.org/bedtimebasics

First

Stillbirth is a devastating experience that can lead to profound grief and loss. The first 24 hours after the loss of a baby are the most critical. It is important to ensure that your baby is properly cared for and that you are not only taking care of your baby but also your own emotional needs.

First Candle is the leading national organization for stillbirth. We are dedicated to providing support and resources for families who have experienced a stillbirth. Our mission is to ensure that every family who experiences a stillbirth has the support and resources they need to heal and move forward.

More information on stillbirth, as well as other tips to help your baby survive and thrive, can be found on the First Candle web site at www.firstcandle.org

Thanks to the First Candle Foundation, you can help the babies who are stillborn.

My due date is (dd.mm.yy) I norm

Day 4		
Day 3		
Day 2		
Day 1		
Day 7		
Day 6		
Day 5		
Day 4		
Day 3		
Day 2		
Day 1		
Day 7		
Day 6		
Day 5		
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Day 4		
Day 3		
Day 2		
Day 1		

WEEK

WEEK 36

WEEK 35

WEEK 34

WEEK 33

WEEK 32

ally count between (time): . and .

Day 7
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Day 5
Day 4
Day 3
Day 2
Day 1

Day 7
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Day 3
Day 2
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Day 7
Day 6
Day 5
Day 4
Day 3
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Day 7
Day 6
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Day 3
Day 2
Day 1

Day 7
Day 6
Day 5
Day 4
Day 3
Day 2
Day 1

Day 7
Day 6
Day 5

WEEK 42

WEEK 41

WEEK 40

WEEK 39

WEEK 38

37

The MISS Foundation

Caring for women and their babies

The M.I.S.S. Foundation was founded in 1996 and is an international non-profit 501(c) 3 organization which offers immediate and on-going support for families experiencing the death of a child from any cause. We offer local support groups, bilingual support, resources, free funeral planning, peer counseling, newsletters, camps for grieving kids, and a wonderful website (www.missfoundation.org).

We also believe strongly in community education and awareness. We offer various programs that range from healthy baby education to bereavement support to annual conferences and seminars for medical professionals helping provide psychosocial intervention to grieving families. For more information, please contact the National MISS Foundation offices at 623.979.1000 or your local office:



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k i c k s



**Your Guide To
Fetal Kick Counts**



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M . I . S . S . F O U N D A T I O N

Education + Awareness = Reduction

Kick Count Chart

Stillbirth is the death of an infant in-utero past 20 weeks gestation. It can happen before or during the onset of labor and can happen to any woman. About 1 in 100 pregnancies will end in stillbirth or about 30,000 per year in the U.S. alone. However, there are some things pregnant women can do to help *reduce the risk* of stillbirth:

1. Around 26 weeks of pregnancy, begin doing daily “kick counts.” If you count less than 8-10 kicks during a 2-hour period or if the baby is moving less than usual, contact your doctor immediately.

2. Do not smoke, drink alcohol, or use drugs (unless prescribed by your physician).
3. Report any vaginal bleeding, leakage, or sharp pain to your health care provider.
4. If you are post-term, be sure to discuss your options and concern with your physician. Pregnancies which last longer than 42 weeks gestation may be at greater risk of stillbirth.
5. It may be necessary to request a second or even a third opinion during your pregnancy to put your mind at ease. Your caregivers should be empathic and respectful of your concerns. You have every right to expect the best care for you and your baby.

Call your doctor immediately if:

- You do not feel 10 movements within 2 hours
- It takes longer and longer for your baby to move 10 times.
- You have not felt the baby move all day.

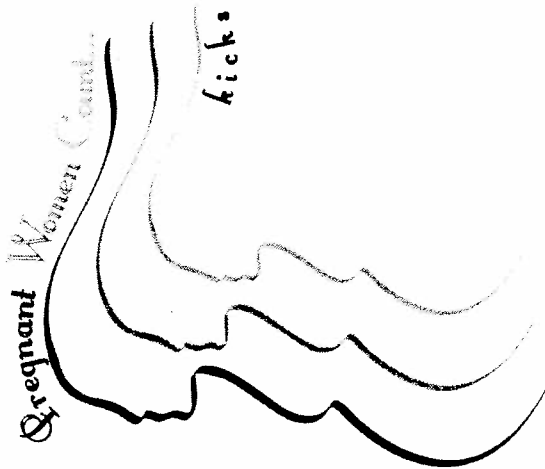
DO NOT WAIT UNTIL TOMORROW!

NOTE: This information is not intended to replace your doctor's advice. This is for informational purposes only. Please call your physician if you have any other questions.



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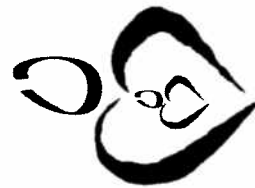
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Your Guide To Fetal Kick Counts

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Know your baby...



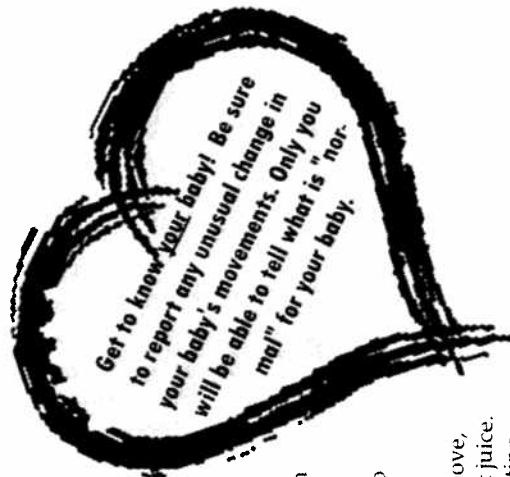
623-979-1000

Healthy babies are active babies...

Your baby moves many times a day. Your baby's kicks may be one of the best signs of its health. Your baby should have at least one 2-hour period each day in which they move at least 10 times. This is usually during a mother's resting time, or right after mom has eaten a meal.

To do the count:

1. Count the baby's movements at the same time every day, often just before bed.
2. A movement may be a kick, swish or roll. Do not count hiccups or small flutters.
3. During this quiet time, start counting your baby's movements.
4. Count all baby movements until you reach 10. DO NOT count for more than 2 hours.
5. Write down the time it took for the baby to move 10 times.
6. If you have trouble getting your baby to move, get up and move around and drink some fruit juice. Then, lay down on your left side and try counting again.



DO NOT WAIT TO CALL YOUR DOCTOR

Kick Count Chart

Instructions: If on the first Sunday you start counting, it takes 12 minutes to get 10 kicks, place a "12" in the first box which covers 1-15 minutes. If on the second day it takes 20 minutes, put a "20" in the second or 16-29 min. box

	Hour 1				Hour 2				2+								
	15	30	45		15	30	45										
Week 26	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Week 34	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week 27	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Week 35	Wed	Sun	Tue	Wed	Thu	Fri	Sat	Sun
Week 28	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Week 36	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week 29	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Week 37	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week 30	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Week 38	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week 31	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Week 39	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week 32	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Week 40	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Week 33	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Week 41	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun

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